3.3.1.7 Warmwater Rivers

3.3.1.7.1 Community Overview

Warmwater rivers are flowing waters with maximum water temperatures typically greater than 25 degrees Celsius. They usually have watershed areas greater than 500 square miles and mean annual flow rates of more than 200 cubic feet per second. Warmwater rivers occur statewide, and include very large rivers such as the Mississippi, Wisconsin, Chippewa, Fox, Wolf and Rock, as well as smaller rivers such as the Sugar, Baraboo, Milwaukee, Flambeau and Yellow. A rich fish fauna, dominated by warmwater species in the families Cyprinidae, Catostomidae, Ictaluridae, Centrarchidae, and Percidae, occurs in these rivers.

Natural, periodic flood flows, most often driven by spring snow melt and rains, are important to the health of floodplain forests and wetlands, and to the maintenance of self-sustaining populations of wetland-spawning fish such as walleye and northern pike. The aquatic life dependent upon these rivers and their floodwaters also supports a variety of mammalian and avian species. Free-flowing, undammed rivers are a critical factor in the existence and perpetuation of widely distributed populations of certain species, especially sturgeon and several species of mollusks that require a far-ranging fish host to complete their life cycle. Dams established for a variety of purposes (power generation, navigation, flood control and recreation) caused noticeable declines in some mollusks by blocking the movement of their fish hosts.

3.3.1.7.2 Vertebrate Species of Greatest Conservation Need Associated with Warmwater Rivers

Forty vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with warmwater rivers (Table 3-63).

Table 3-63. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with warmwater rivers.

Species Significantly Associated with Warmwater Rivers
Birds
Canvasback
Osprey
Bald Eagle
Fish
Lake Sturgeon
Pallid Shiner
Gravel Chub
Striped Shiner
Redfin Shiner
Shoal Chub (Speckled Chub)
Blue Sucker
Black Redhorse
Starhead Topminnow
Crystal Darter
Bluntnose Darter
Gilt Darter
Herptiles
Mudpuppy
Blanchard's Cricket Frog
Pickerel Frog

Table 3-63 *continued*

Mink Frog
Wood Turtle
Midland Smooth Softshell Turtle
Queen Snake
Species Moderately Associated with Warmwater Rivers
Birds
Great Egret
Yellow-crowned Night-heron
Lesser Scaup
Dunlin
Fish
Paddlefish
Goldeye
Black Buffalo
River Redhorse
Greater Redhorse
Longear Sunfish
Western Sand Darter
Least Darter
Herptiles
Blanding's Turtle
Mammals
Northern Long-eared Bat
Silver-haired Bat
Eastern Red Bat
Hoary Bat
Moose

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-63 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both warmwater rivers and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of warmwater rivers in each of the Ecological Landscapes (Tables 3-64 and 3-65).

- Using the analysis described above, a species was further selected if it had both a significant association with warmwater rivers and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of warmwater rivers. These species are shown in Figure 3-7.

Table 3-64. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with warmwater rivers and their association with Ecological Landscapes that support warmwater rivers.

Warmwater Rivers	Birds (3)*			Fish (12)												Herptiles (7)						
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Canvasback	Osprey	Bald Eagle	Lake Sturgeon	Pallid Shiner	Gravel Chub	Striped Shiner	Redfin Shiner	Shoal Chub (Speckled Chub)	Blue Sucker	Black Redhorse	Starhead Topminnow	Crystal Darter	Bluntnose Darter	Gilt Darter	Mudpuppy	Blanchard's Cricket Frog	Pickerel Frog	Mink Frog	Wood Turtle	Midland Smooth Softshell Turtle	Queen Snake
MAJOR																						
Central Lake Michigan Coastal	M	H	M	H					M							H		M		M		
Central Sand Hills		M	H	H					H									M			H	
Forest Transition	M	H	H					H			H					M		M		H		
North Central Forest	M	H	H	H											H	M		M	H	H		
Northeast Sands		H	H	H												H		M	H	H		
Northern Highland	M	H	H	M												M			H	H		
Northern Lake Michigan Coastal	H	H	H	H				M	H							H		M	H	H		
Northwest Lowlands		M		H											H	M		M	H	H		
Northwest Sands	M	H	H	M											M	M		M	M	H		
Southeast Glacial Plains	H			H		H		H				H				M		H				H
Western Coulee and Ridges	H	M	H	H	H				H	H		H	H	H	M		H	H		H	H	
Western Prairie	M			M						M			H			M		M		H		
IMPORTANT																						
Central Sand Plains	M	H	H	H												H		M		H	M	
Southern Lake Michigan Coastal				M			H									H						M
Superior Coastal Plain	M		H	H												H		M	H	H		
PRESENT (MINOR)																						
Southwest Savanna						M											H	H				

Color Key
H = HIGH probability the species occurs in this Ecological Landscape
M = MODERATE probability the species occurs in this Ecological Landscape
= LOW or NO probability the species occurs in this Ecological Landscape

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

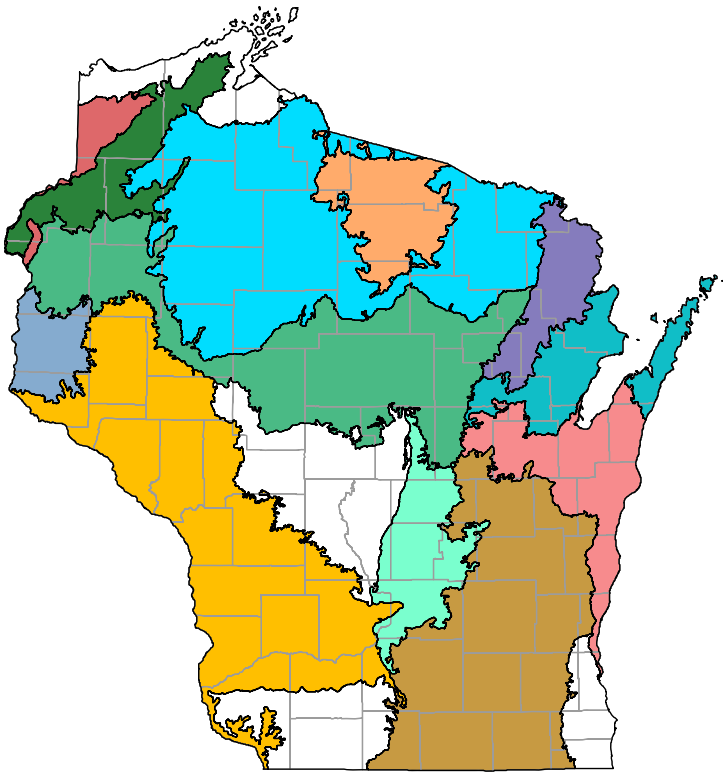
Table 3-65. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with warmwater rivers and their association with Ecological Landscapes that support warmwater rivers.

Warmwater Rivers	Birds (4)*				Fish (8)								Herptiles (1)	Mammals (5)				
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Great Egret	Yellow-crowned Night-Heron	Lesser Scaup	Dunlin	Paddlefish	Goldeye	Black Buffalo	River Redhorse	Greater Redhorse	Longear Sunfish	Western Sand Darter	Least Darter	Blanding's Turtle	Northern Long-eared Bat	Silver-haired Bat	Eastern Red Bat	Hoary Bat	Moose
MAJOR																		
Central Lake Michigan Coastal	■	▭	■	■				▭	▭		▭		▭	▭	▭	▭	▭	
Central Sand Hills				▭	■		■				■	■	■	▭	▭	▭	▭	
Forest Transition			■	▭										▭	▭	■	▭	
North Central Forest			■						▭	■				▭	■	▭	■	▭
Northeast Sands													▭					
Northern Highland			■	▭					■	■		▭				▭		▭
Northern Lake Michigan Coastal	■		■	■					▭	▭	▭		▭	▭	▭	▭	▭	
Northwest Lowlands								■	■	▭				▭	▭	▭	▭	▭
Northwest Sands			■	▭				■	■			■	■					
Southeast Glacial Plains		▭	■	■			▭	■	■	■	▭	■	■	▭	▭	▭	▭	
Western Coulee and Ridges	■	■	■		■	■	■	■			■		■	■	▭	▭	▭	
Western Prairie	▭		▭	▭				▭	▭		▭		■					
IMPORTANT																		
Central Sand Plains			■	▭				▭			▭		■	▭	▭	▭	▭	
Southern Lake Michigan Coastal		▭	■	■					▭				■					
Superior Coastal Plain			■	■										▭	▭	▭	▭	▭
PRESENT (MINOR)																		
Southwest Savanna													■	▭		▭		

Color Key
■ = HIGH probability the species occurs in this Ecological Landscape
▭ = MODERATE probability the species occurs in this Ecological Landscape
▭ = LOW or NO probability the species occurs in this Ecological Landscape

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

Figure 3-7. Vertebrate Species of Greatest Conservation Need that have ***both* a significant association with warmwater rivers ***and*** a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of warmwater rivers.**



Central Lake Michigan Coastal
Osprey
Lake Sturgeon
Mudpuppy

Central Sand Hills
Bald Eagle
Lake Sturgeon
Shoal Chub (Speckled Chub)
Midland Smooth Softshell Turtle

Forest Transition
Osprey
Bald Eagle
Redfin Shiner
Black Redhorse
Wood Turtle

North Central Forest
Osprey
Bald Eagle
Lake Sturgeon
Gilt Darter
Mink Frog
Wood Turtle

Northeast Sands
Osprey
Bald Eagle
Lake Sturgeon
Mudpuppy
Mink Frog
Wood Turtle

Northern Highland
Osprey
Bald Eagle
Mink Frog
Wood Turtle

Northern Lake Michigan Coastal
Canvasback
Osprey
Bald Eagle
Lake Sturgeon
Shoal Chub (Speckled Chub)
Mudpuppy
Mink Frog
Wood Turtle

Northwest Lowlands
Lake Sturgeon
Gilt Darter
Mink Frog
Wood Turtle

Northwest Sands
Osprey
Bald Eagle
Wood Turtle

Southeast Glacial Plains
Canvasback
Lake Sturgeon
Gravel Chub
Redfin Shiner
Starhead Topminnow
Pickerel Frog
Queen Snake

Western Coulees and Ridges
Canvasback
Bald Eagle
Lake Sturgeon
Pallid Shiner
Shoal Chub (Speckled Chub)
Blue Sucker
Starhead Topminnow
Crystal Darter
Bluntnose Darter
Blanchard's Cricket Frog
Pickerel Frog
Wood Turtle
Midland Smooth Softshell Turtle

Western Prairie
Crystal Darter
Wood Turtle

3.3.1.7.3 Threats and Priority Conservation Actions for Warmwater Rivers

The following list of threats and priority conservation actions were identified for warmwater rivers in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Tables 3-64 and 3-65 unless otherwise indicated.

Threats and Issues

- Non-point source pollution resulting from urban and agricultural runoff in the watershed is degrading warmwater river habitats.
- Dams have eliminated riverine habitat, blocked migrations, fragmented populations, and created masses of sediment bearing levels of pollutants that are sometimes harmful to fish and other aquatic species.
- Point-source pollution from industrial and municipal sources (historic impact, now largely controlled).
- Alteration of the Mississippi River and the lower reaches of some Lake Michigan tributaries for purposes of commercial navigation has fragmented and degraded habitat.
- Invasive aquatic species (e.g., common carp, Asian carp, zebra mussel) are disrupting natural communities by altering habitats, food webs, and species interactions.

Priority Conservation Actions

- Improve watershed land-use practices to reduce non-point source pollution.
- Remove dams (as has been done along the Baraboo River (Sauk County), the lower Milwaukee River (Milwaukee County) and other waterways) or install effective fish passage at dams to partially mitigate dam impacts.
- Continue effective treatment and regulation of industrial and municipal discharges.
- Better regulation of existing commercial navigation activites is needed along with effective mitigation of negative impacts resulting from these activities. Expansion of commercial navigation activities should not occur unless there is scientific evidence to assure that there will be no negative impacts to riverine habitats and the species they harbor.
- Improve regulations and education to prevent the introduction new invasive aquatic species and slow the spread of existing exotic species.
- Use appropriate, ecologically sound methods for controlling invasive species. More research is needed to identify and assess the effectiveness (and potential impacts to non-target species) of methods for controlling aquatic invasive species.